

REMARKS

The Examiner is thanked for carefully reviewing the present application. The present amendment is in response to the Office Action mailed on July 13, 2005 regarding claims 1-40. Applicant has thoroughly reviewed the outstanding Office Action including the Examiner's remarks and the references cited therein. The following remarks are believed to be fully responsive to the Office Action and render all claims at issue patentably distinguishable over cited references.

Favorable reconsideration is requested in view of the following remarks.

Claims 1 and 22 are amended, and thereof claims 1-40 are now pending in the application. These amendments contain no new matter nor raise new issues.

CLAIM REJECTIONS UNDER 35 U.S.C. §102

Claims 1-4, 7-11, 13, 14, 16, 18, 20, 22-24, 26-32, 34, 36, 38 are rejected under 35 U.S.C. 102(b) as being anticipated by Forrest, *et al.* (US Pre-grant Publication 2001/0002279) (hereinafter referred to as "Forrest, *et al.*"). These rejections are respectfully traversed. As will be fully explained below, it is respectfully submitted that Forrest, *et al.* do not anticipate the claimed features of the present application, and the Applicant respectfully requests that the Section 102(b) rejections be withdrawn.

As recited in the amended claims 1 and 22, the present invention is directed to a method for manufacturing an organic light-emitting diode, comprising: providing a substrate into a chamber; forming an anode on the substrate; forming a hole transport layer on the anode, wherein the step of forming the hole transport layer comprises adding a reaction gas, and the reaction gas forms a plurality of impurities in the hole transport layer to trap holes; forming an electron transport layer on the hole transport layer, and the step of forming the electron transport layer is performed without using the reaction gas; and forming a cathode on the electron transport layer. In claim 22, the step of forming the hole transport layer is an evaporation step, and the evaporation step comprises evaporating the material of the hole transport layer and the reaction

gas to make the reaction gas form the impurities in the hole transport layer to confine holes. When the holes transport to the position of the molecules of the reaction gas, the molecules catch the holes and block the transmission of the holes. A large number of holes are confined in the hole transport layer, so that the amount of the holes injected into the electron transport layer is decreased. Therefore, the amount of electrons and the amount of the holes in the electron transport layer are more balanced; the waste of holes is reduced; the recombination rate of electrons and holes is increased; and the objective of enhancing luminance efficiency of the organic light-emitting diode is achieved.

As described by the Examiner, Forrest, *et al.* disclose a method for manufacturing an organic light-emitting diode, comprising: providing a substrate into a chamber (paragraphs 18, 19); forming an anode on the substrate (paragraph 42); forming a hole transport layer on the anode (paragraph 43), wherein the step of forming the hole transport layer comprises adding a reaction gas, and the reaction gas forms a plurality of impurities to trap holes (paragraph 43); forming an electron transport layer on the hole transport layer (paragraph 44); and forming a cathode on the electron transport layer (paragraph 45). However, according to the content described in the paragraphs 43 and 44 of Forrest, *et al.*, the step of forming the hole transport layer uses nitrogen as the carrier gas to carry the materials of the hole transport layer, and Forrest, *et al.* do not use the carrier gas to form impurities in the hole transport layer for trapping holes (paragraph 43, lines 3-6). In addition, the step of forming the electron transport layer also uses nitrogen as the carrier gas (paragraph 44, lines 3-5). In claims 1 and 22, only the step of forming the hole transport layer use the reaction gas to form impurities in the hole transport layer, and the step of forming the electron transport layer has to be performed without the use of the reaction gas used in the step of forming the hole transport layer.

According to the aforementioned description, it is obvious that Forrest, *et al.* completely do not anticipate the technique features recited in the claims 1 and 22 of the present application, and the claims 1 and 22 are allowable.

Since claims 1 and 22 are allowable, dependent claims 2-4, 7-11, 13, 14, 16, 18 and 20 each of which depends from independent claim 1, and dependent claims 23, 24, 26-32, 34, 36 and 38 each of which depends from independent claim 22 are likewise believed to be allowable. Accordingly, Applicant respectfully requests that the Section 102(b) rejections be reconsidered and withdrawn.

CLAIM REJECTIONS UNDER 35 U.S.C. §103

1. Claims 5, 6, 12, 17, 25, 35 and 39 are rejected under 35 U.S.C.103(a) as being unpatentable over Forrest, *et al.* as applied to claims 1, 22 above and further in view of Yamanaka, *et al.* (U.S. Pre-grant Publication 2002/0160553) (hereinafter referred to as "Yamanaka, *et al.*"). These rejections are respectfully traversed. As will be fully explained below, it is respectfully submitted that Forrest, *et al.* and Yamanaka, *et al.* do not render the claimed invention obvious, and Applicants respectfully requests that the Section 103(a) rejection be withdrawn.

According to the description of Yamanaka, *et al.*, it is found that Yamanaka, *et al.* neither disclose nor teach the principal technique feature of the claimed invention, i.e. using the reaction gas to form impurities in the hole transparent layer during the formation of the hole transparent layer. Moreover, according to the aforementioned description, Forrest, *et al.* also fail to disclose the principal technique feature of the claimed invention.

Just as the aforementioned description, since Forrest, *et al.* and Yamanaka, *et al.* both fail to disclose the principal technique feature of the claimed invention, and the independent claims 1 and 22 are allowable, dependent claims 5, 6, 12 and 17 which depends from independent claim 1, and dependent claims 25, 35 and 39 each of which depends from independent claim 22 are likewise believed to be allowable. Accordingly, Applicant respectfully requests that the Section 103(a) rejections be withdrawn.

2. Claims 15, 19, 33 and 37 are rejected under 35 U.S.C.103(a) as being unpatentable over Forrest, *et al.* as applied to claims 1, 22 above and further in view of Kim, *et al.* (U.S.

Pre-grant Publication 2002/0098378) (hereinafter referred to as “Kim, *et al.*”). These rejections are respectfully traversed. As will be fully explained below, it is respectfully submitted that Forrest, *et al.* and Kim, *et al.* do not render the claimed invention obvious, and Applicant respectfully requests that the Section 103(a) rejection be withdrawn.

Kim, *et al.* neither disclose nor teach the principal technique feature of the claimed invention, i.e. using the reaction gas to form impurities in the hole transparent layer during the formation of the hole transparent layer. Furthermore, according to the aforementioned description, Forrest, *et al.* also fail to disclose the principal technique feature of the claimed invention.

Just as the aforementioned description, since Forrest, *et al.* and Kim, *et al.* both fail to disclose the principal technique feature of the claimed invention, and the independent claims 1 and 22 are allowable, dependent claims 15 and 19 which depends from independent claim 1, and dependent claims 33 and 37 which depends from independent claim 22 are likewise believed to be allowable. Accordingly, Applicant respectfully requests that the Section 103(a) rejections be withdrawn.

3. Claims 21 and 40 are rejected under 35 U.S.C.103(a) as being unpatentable over Forrest, *et al.* as applied to claims 1, 22 above and further in view of Pichler, *et al.* (U.S. Patent No. 6402579) (hereinafter referred to as “Pichler, *et al.*”). These rejections are respectfully traversed. As will be fully explained below, it is respectfully submitted that Forrest, *et al.* and Pichler, *et al.* do not render the claimed invention obvious, and Applicant respectfully requests that the Section 103(a) rejection be withdrawn.

According to the description of Pichler, *et al.*, it is found that Pichler, *et al.* do not disclose the principal technique feature of the claimed invention, i.e. using the reaction gas to form impurities in the hole transparent layer during the formation of the hole transparent layer. In addition, according to the aforementioned description, Forrest, *et al.* also fails to disclose the principal technique feature of the claimed invention.

Just as the aforementioned description, since neither Forrest, *et al.* nor Pichler, *et al.* discloses the principal technique feature of the claimed invention, and the independent claims 1 and 22 are allowable, dependent claim 21 which depends from independent claim 1, and dependent claim 40 which depends from independent claim 22 are likewise believed to be allowable. Accordingly, Applicant respectfully requests that the Section 103(a) rejections be withdrawn.

CONCLUSION

In light of the above remarks, Applicant respectfully submits that claims 1-40 as currently presented are in condition for allowance and hereby requests reconsideration. Applicant respectfully requests that Examiner pass the case to issue at the earliest convenience.

Should the Examiner believe that a telephone conference would expedite issuance of the application, the Examiner is respectfully invited to telephone the undersigned attorney at (202) 861-1792.

Respectfully submitted,

BAKER & HOSTETLER, LLP

A handwritten signature in black ink, appearing to read "P. Alan Larson", with a long horizontal stroke extending to the right.

P. Alan Larson
Registration No. 53,184

Date: 10/12/05
Washington Square, Suite 1100
1050 Connecticut Avenue, N.W.
Washington, D.C. 20036-5304
Telephone: 202-861-1500
Facsimile: 202-861-1783